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EXAMINER

CULBERT, ROBERTS P

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/727,191

Applicant(s)

KUBBY ET AL.

Examiner

Roberts Culbert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/26/04</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION***Claim Objections***

Claims 18 and 19 are objected to because of the following informalities: The claims recite "*The system of claim 1...*" A phone call was made to the attorney of record on 3/9/05 who indicated that the claims should instead recite "*The method of claim 1...*" and would be amended in the response to the first Office Action on the merits. Therefore claims 18 and 19 will be examined on the merits based on the suggested amendment. Appropriate correction is required.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the device layer and silicon-on-insulator wafer as recited in Claims 20-22 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2 and 4-19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent application Publication 2003/0029705 A1 to Qiu et al.

Regarding Claim 1, Qiu et al. teaches a method for fabricating a bistable microelectromechanical system (MEMS) based system, comprising: lithographically defining at least one beam having a specified non-linear shape corresponding to a first stable state of the at least one beam. (Paragraphs 59, 62, 203 and 207)

Regarding Claims 2 and 5-13, Qiu et al. illustrates that a beam is defined by the lithography process. The beam has a certain geometry (Paragraphs 59, 62) inherently including a certain curvature, height, length and width. The geometry of the beam inherently determines the second stable state, the throw distance, and the force curve as claimed by applicant.

Regarding Claims 17-19, Qiu et al. illustrates boundary conditions for the beam may include fixed, bearing and spring boundary conditions. (See for example, Paragraphs 76, 132 and 133)

Regarding Claims 14-16, Qiu et al. teaches that various actuators are suitable for use with the beam, including a thermal impact actuator (Paragraph 178) and a zippering electrostatic actuator (Paragraph 155).

Regarding Claim 4, Qiu et al. illustrates various stops for contacting the beam between the first and second stable states. (See Figures 12d-12f, for example) Note that although it is not explicitly stated, the beam must reach the contact point just before reaching the second stable state in order to contact the stop as illustrated by Qiu et al.

Claims 1, 2, 5-14 and 19-22 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,303,885 to Hichwa et al.

Hichwa et al. teaches a method for fabricating a bistable microelectromechanical system (MEMS) based system, comprising: lithographically defining (masking and etching) at least one beam having a specified non-linear shape (Figure 1A) corresponding to a first stable state of the at least one beam.

Regarding Claims 2 and 5-13, Hichwa et al. illustrates that a beam is defined by the lithography process. The beam inherently has a certain geometry including a certain curvature, height, length and width. The geometry of the beam inherently determines the second stable state, the throw distance, and the force curve as claimed by applicant.

Regarding Claims 20-22, Hichwa et al. teaches patterning the at least one beam in a device layer of a silicon-on-insulator wafer (Col. 4, Lines 29-57), defining a height of the at least one beam using a thickness of the device layer (Col. 8, Lines 29-36), and partially etching an insulator layer between the device layer and a substrate to release the at least one beam with part of the insulator layer remaining to anchor the at least one beam to the substrate. (See Figure 3B and related discussion)

Regarding Claim 14 Hichwa et al. teaches forming at least one of thermal actuator, an electrostatic actuator, a piezoelectric actuator and a magnetic actuator adjacent the at least one beam. (Col. 2, Lines 37-40)

Regarding Claim 19, Hichwa et al. teaches forming at least one spring boundary condition of the at least one beam. (Figures 2B-2D)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 15, 16 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent application Publication 2003/0029705 A1 to Qiu et al. in view of U.S. Patent 6,303,885 to Hichwa et al.

Regarding Claims 15 and 16, as applied above to claims 1,2 and 4-19, Qiu et al teaches the method of the invention substantially as claimed, but does not explicitly teach the use of a zippering electrostatic actuator or a thermal impact actuator. Qiu et al. teaches that various actuators are suitable for use with an actuated bistable beam, including a thermal impact actuator (Paragraph 178) and a zippering electrostatic actuator (Paragraph 155).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the well-known thermal and electrostatic actuators as suggested by Qiu et al. to actuate the bistable beam of Hichwa et al. since Hichwa teaches that electrostatic and thermal actuators are suitable means for driving the bistable beam (Col. 2, Lines 37-40)

Regarding Claims 20-22, as applied above to claims 1,2 and 4-19, Qiu et al teaches the method of the invention substantially as claimed, but does not teach patterning the at least one beam in a device layer of a silicon-on-insulator wafer, defining a height of the at least one beam using a thickness of the device layer, and partially etching an insulator layer between the device layer and a substrate to release the at least one beam with part of the insulator layer remaining to anchor the at least one beam to the substrate.

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However, Qiu et al. suggests that various manufacturing methods may be employed especially conventional micro-fabrication techniques in silicon (Paragraph 202)

Hichwa et al. teaches a conventional microfabrication technique used in the patterning of bistable MEMS structures comprising patterning the at least one beam in a device layer of a silicon-on-insulator wafer, defining a height of the at least one beam using a thickness of the device layer, and partially etching an insulator layer between the device layer and a substrate to release the at least one beam with part of the insulator layer remaining to anchor the at least one beam to the substrate.

It would have been obvious to one of ordinary skill in the art at the time of invention to use one of the well-known MEMS fabrication techniques such as shown in Hichwa et al. to form the bistable MEMS structure of Qiu et al. in order to form the bistable MEMS structure using one of several known conventional processing methods.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent application Publication 2003/0029705 A1 to Qiu et al. in view of U.S. Patent 6,367,251 to Wood.

As applied above to claims 1,2 and 4-19, Qiu et al teaches the method of the invention substantially as claimed, but does not teach that the height of the beam is greater than the width. The relationship between height and width cannot be determined since the illustrations of the beams are not in three dimensions.

Wood illustrates bi-stable beams having a height greater than the width. (Figures 1A and 1B) It would have been obvious to one of ordinary skill in the art at the time of invention to form the beams of Qiu et al. having the relative dimensions as shown in Wood in order to provide a bi-stable beam having the conventional physical and mechanical characteristics as shown in Wood.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,303,885 to Hichwa et al. in view of U.S. Patent 6,367,251 to Wood.

As applied above to claims 1,2, 5-14 and 20-22, Hichwa et al teaches the method of the invention substantially as claimed, but does not teach that the height of the beam is greater than the width. The

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relationship between height and width cannot be determined since the illustrations of the beams are not in three dimensions.

Wood illustrates bi-stable beams having a height greater than the width. (Figures 1A and 1B) It would have been obvious to one of ordinary skill in the art at the time of invention to form the beams of Hichwa et al. having the relative dimensions as shown in Wood in order to provide a bi-stable beam having the conventional physical and mechanical characteristics as shown in Wood.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. Culbert



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